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QUANTITATION OF MICROWAVE RADIATION EFFECTS ON THE HEAD AND EYE--ETC(U)  
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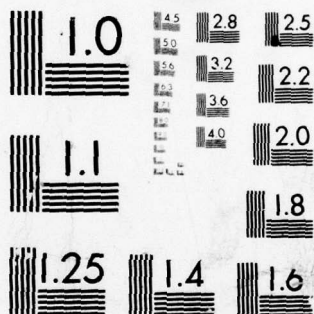
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MICROCOPY RESOLUTION TEST CHART  
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⑥ QUANTITATION OF MICROWAVE RADIATION EFFECTS ON  
THE HEAD AND EYES OF RABBITS, PRIMATES AND MAN.

⑩ PIRO O. / KRAMAR

UNIVERSITY OF WASHINGTON  
SCHOOL OF MEDICINE

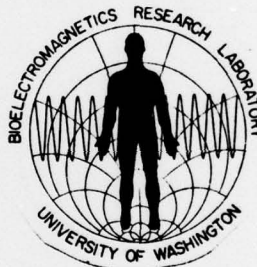
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I. Introduction:

During the 1972-1977 period we have completed all of the proposed studies, except for the determination of ocular blood flow. Although we have been unable to meet fully our initial goal- i.e. extrapolating the results of animal experiments to man- we have shown that the thermal computer model is a valid method to predict thermal conditions existing in various species. The major stumbling block for complete accuracy in its use is the lack of quantitative blood flow values.

II. Progress Summary:

A. Repeated subthreshold exposures to 2450 MHz, "C" Director.

The right eyes of five adult albino rabbits, under intravenous pentobarbital anesthesia, were exposed to the "C" Director in the near field as follows:

Group	Power Density	Length of Single Exposure in Min.	Frequency of Exposures	No. Rabbits	No. of Cataracts
I.	300 mW/cm <sup>2</sup>	5	Every other Day X 5	3	3
II.	300 mW/cm <sup>2</sup>	5	Every Third Day X 5	2	0

The left eyes served as controls. The known cataractogenic threshold time level for an incident "apparent" power density (A.P.D.) of 300 mW/cm<sup>2</sup> for a single exposure is 10 minutes (2). We have shown previously (Dec. 1975-Nov. 1976, Report p 2) that if the time level was reduced to 5 minutes, but repeated daily, lens opacities developed. From the above table it is apparent that under these specific conditions, two days are required between exposures to allow the lens to recover. This represents the "protective" period mentioned by Carpenter (2).

Direct retrolental temperatures were measured in another group of adult albino rabbits. After pentobarbital anesthesia, retrolental temperatures were measured before and after each microwave exposure in the near field (Dec. 1975-Nov. 1976 Report). The A.P.D. in all cases was 300 mW/cm<sup>2</sup> for 5 minutes. Except for

traumatic cataract formation from the repeated manipulations, no untoward effects were noted.

The schedule of exposures and temperature recordings are shown below:

Group	Frequency	No. of Animals	Average T in °C
I.	Daily X 3 - 7	3	6.0
II.	Alternate Days X 3 - 5	3	5.5
III.	Every 3rd Day X 5	2	6.5

There was no progressive increase in the post-irradiation temperatures, nor was there a consistent pattern of the pre-irradiation temperatures. However, the post-irradiation temperatures were recorded between 42°C and 46°C, in all cases.

#### B. Determination of Ocular Blood Flow.

Two rabbits were used for fluorescein iris angiography in an attempt to determine ocular blood flow. Both studies were performed on anesthetized animals, not exposed to microwaves. It was apparent, that although this method gave good visualization of the iris vascular architecture, the results could lead to a qualitative analysis only.

A second method, using nuclide labelled microspheres (Sr<sup>85</sup>), was explored (3). Three rabbits were used in a pilot study to determine the feasibility and reliability of the method. Microspheres of 9 $\mu$  and 12 $\mu$  in separate experiments, were injected into the left ventricle, and the number of microspheres trapped in the eye was compared to the number leaked into the orbital sinus. With such small microspheres, the trapping in the eye was not sufficient to allow accurate blood-flow measurements (4). Due to lack of funds and time, injection of larger microspheres was not attempted.

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